

(19) JAPANESE PATENT OFFICE (JP)

(12) Official Gazette for Unexamined Patent Applications (A)

(11) Japanese Unexamined Patent Application (Kokai) No. Hei 5-305129

(43) Disclosure Date: 19 November 1993

(51) Int.Cl. ⁵	Ident. Symbols	Internal Office Nos.	FI	Technology Indication
A61L 15/16				
A61F 13/00	301 J	7108-4C		
		7108-4C	A61L 15/01	
Request for Examination: Not yet requested			Number of Claims: 2 (Total of 3 pages)	

(21) Application No.: Hei 4-139682

(22) Application Date: 2 May 1992

(71) Applicant: 000196107
Nishikawa Rubber Industrial Co., Ltd.
2-8 Michichi-machi, Nishi-ku, Hiroshima-ku,
Hiroshima-ken

(74) One of the Agents of the Above: Yoshihiro
Yoshida, Patent Attorney

(71) Applicant: 000001144
Director, Agency of Industrial Science and
Technology
3-1 Kasumigaseki 1-chome, Chiyoda-ku,
Tokyo-to

(74) One of the Agents of the Above: Director of
the Shikoku Industrial Technology
Laboratory, Agency of Industrial Science and
Technology (And 1 Other)

(72) Inventor: Kazunori Matsuga
c/o Department of Plastic Surgery
Kagawa Medical University
1750-1 Oaza Ikenobe, Miki-cho, Kita-gun,
Kagawa-ken

Continued on last page

(54) [Title of the Invention] Coating
Protective Material for Use in Medical
Treatment

(57) [Abstract]

[Objective] To provide a wound coating
protective material that has a greater wound
healing effectiveness and that is of lower cost
than conventional materials.

[Structure] It is a coating protective
material for use in medical treatment comprised

of a foamed body of which chitosan and cellulose are the principal constituents. In addition, it is a coating protective material for use in medical treatment in which, as required, at least one of gauze, nonwoven fabric or paper is compounded with the foamed body of which chitosan and cellulose are the principal constituents.

[Claims]

[Claim 1] A coating protective material for use in medical treatment comprised of a foamed body of which chitosan and cellulose are the principal constituents.

[Claim 2] A coating protective material for use in medical treatment in which, as required, at least one of gauze, nonwoven fabric or paper is compounded with the foamed body of which chitosan and cellulose are the principal constituents.

[Detailed Description of the Invention]

[0001]

[Field of industrial use] This invention relates to a coating protective material for use in medical treatment comprised of a foamed body of which chitosan and cellulose are the principal constituents.

[0002]

[Prior art] In the past, there have been disclosures and announcements of patent applications for special gauze containing fradiomycin sulfate (brand name: Sofratule, manufacture by Nippon Roussel), Atherocollagn nonwoven fabric (brand name: Meipack; manufactured by Meiji Seika), chitin nonwoven fabric (brand name: Beschitin W, manufactured by Unitica Co.), freeze-dried pig skin (brand name: Metaskin, manufactured by Mitsui Seiyaku (Ltd.)) and fibrin membranes have been used as coating protective materials for use in medical treatment that coat and protect wounds and that have a healing promoting effect. In addition, there are also chitin sponges.

[0003] However, although the above-described conventional coating protective materials for use in medical treatment have advantages and shortcomings, there are the problems that they are not completely satisfactory from the standpoints of exudate absorption capacity, close adherence to wound surfaces, air-permeability, healing promoting effect and cost.

[0004]

[Problems the invention is intended to solve] The problems that are to be solved are that, although the above-described conventional coating protective materials for use in medical treatment have advantages and shortcomings, there are the problems that they are not completely satisfactory from the standpoints of exudate absorption capacity, close adherence to wound surfaces, air-permeability, healing promoting effect and cost.

[0005]

[Means for solving the problems] The first invention is a coating protective material for use in medical treatment comprised of a foamed body of which chitosan and cellulose are the principal constituents. In addition, the second invention is a coating protective material for use in medical treatment in which, as required, at least one of gauze, nonwoven fabric or paper is compounded with the foamed body of which chitosan and cellulose are the principal constituents.

[0006]

[Working example] We shall now describe a working example. 2.5 g of chitosan powder (brand name: Chitosan 10B, manufactured by Katoyoshi) was dissolved in 150 milliliters of 1.3% acetic acid solution to make an acetic acid solution of chitosan. Further, 250 g of a substance consisting of 25% cellulose (brand name: KY-100S, manufactured by Daicel Chemical Industries (Ltd.)) redispersed to 4% with pure water was mixed with 18 g of glycerol to make a cellulose-glycerol mixed solution. The above described

acetic acid solution of chitosan was mixed with this cellulose-glycerol mixed solution, 400 g of pure water, and, as a surfactant, 0.4 g of polyoxyethylene sorbitan monolaurate (brand name: Nonion LT-221, manufactured by Nippon Yushi (Ltd.)) were added to 400 g of the mixture that had been made and the mixture was foamed by stirring. At the time the volume of this foamed mixture became 2 liters, 8 g of ammonium carbonate was added as a coagulating agent and it was spread to a thickness of 12 mm, after which, when it was air-dried for 12 hours at 70°C, a chitosan-cellulose foamed body of a thickness of approximately 4 mm and an apparent density of approximately 0.04 g/cm³ was obtained. When the above-described foamed mixture was spread on gauze, nonwoven fabric or paper and dried, a single body was readily formed and the foamed body could be reinforced.

[0007] We shall now describe its action by means of an example in which a 12 week old SD strain rat of a body weight of about 300 g was used as the experimental animal. A circular wound of 35 mm in diameter was made through all layers of the skin on the back of the rat and a close-up picture (photograph) of the wound site was made at a fixed magnification, after which, the product of this invention, which had been steam-sterilized at 121°C for 20 minutes, and a commercial chitin nonwoven fabric were

affixed, tied over and immobilized. After 1 week, a close-up picture (photograph) of the wound site was again made at a fixed magnification and the areas of the skin wound before and after application of the coating protective layer were determined from the photographs. A digital planimeter (brand name: Koizumi KP90) was used for the determinations. The results for the area of healing are shown in Table 1. It was found that the product of this invention was clearly superior to commercial chitosan nonwoven fabrics in respect to healing effectiveness.

[0008] In addition, because it was a foamed body, it provided superior adsorption of exudate, and, because it had suitable pliability, it exhibited superior properties for the wound, was closely adhered and in good contact with the skin. Because it had a continuous foamed structure, it exhibited good air-tightness and was of a lower cost as a raw material than when 100% chitin material was used.

[0009]

[Effect of the invention] The product of this invention as described above, as should be evident from Table 1, has a greater healing promoting effect and a lower cost than conventional wound coating protective materials.

[Table 1]

Type	Data number	Area of healing (cm ²)	
		Mean	SD
Untreated	10	0.41	0.62
Chitin nonwoven fabric	10	2.50	0.53
Product of this invention	6	4.48	0.98

Continued from front page

(72) Inventor: Masashi Nishiyama
c/o Shikoku Industrial Technology Laboratory
Agency of Industrial Science and Technology,
Ministry of International Trade and Industry,
3-3 Hananomiya-cho 2-chome, Takamatsu-shi,
Kagawa-ken

(72) Inventor: Jun Hosokawa
c/o Shikoku Industrial Technology Laboratory
Agency of Industrial Science and Technology,
Ministry of International Trade and Industry,
3-3 Hananomiya-cho 2-chome, Takamatsu-shi,
Kagawa-ken

[Translator's Note: The Ministry of International Trade and Industry (MITI) has been renamed and is now the Ministry of Economy, Trade and Industry.]

(72) Inventor: Hirokazu Yamamoto
c/o Nishikawa Rubber Industrial Company, Ltd.
2-8 Michichi-machi, Nishi-ku, Hiroshima-ku,
Hiroshima-ken

(72) Inventor: Kunihiko Hashimoto
c/o Nishikawa Rubber Industrial Company, Ltd.
2-8 Michichi-machi, Nishi-ku, Hiroshima-ku,
Hiroshima-ken